LLNL Environmental Restoration Division (ERD)
Standard Operating Procedure (SOP)

ERD SOP 4.5: General Equipment Decontamination—Revision: 5

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1.0 PURPOSE

The purpose of this SOP is to describe methods used for decontamination of field equipment that becomes potentially contaminated during field operations.

2.0 APPLICABILITY

This procedure applies to the decontamination of applicable equipment used for environmental sampling and monitoring activities, prior to, and/or after contact with soils, surface water, or ground water. This procedure is performed to prevent the potential of cross contamination. It also minimizes the possibility of exposure to field personnel from the handling of improperly decontaminated equipment. The equipment may include split spoon samplers, sampling pumps, bailers, trowels, shovels, drill bits, augers, drill rigs, or any other equipment used during field activities.

3.0 REFERENCES

3.1 U.S. Environmental Protection Agency (1987), *A Compendium of Superfund Field Operations Methods*, EPA/540/P-87/001.

3.2 Grandfield, C. H. (1989), *Guidelines for Discharges to the Sanitary-Sewer System*, Lawrence Livermore National Laboratory, Livermore, California (UCAR 10235).

3.3 NIOSH, OSHA, USCG, and EPA (1985), *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), U.S. Coast Guard (USCG), and U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, NIOSH.

4.0 DEFINITIONS

See SOP Glossary.

5.0 RESPONSIBILITIES

5.1 Division Leader

The Division Leader's responsibility is to ensure that all activities performed by ERD at the Livermore Site and Site 300 are performed safely and comply with all pertinent regulations and procedures, and provide the necessary equipment and resources to accomplish the tasks described in this procedure.

5.2 Field Personnel

It is the responsibility of all personnel involved with sample collection or decontamination to maintain a clean working environment and to ensure that no contaminants are negligently introduced into the environment. Decontamination is performed in the same level of protective clothing as the sampling activities, unless the Site Health and Safety Plan specifies a different level of protection.

6.0 PROCEDURE

6.1 General

6.1.1 Decontamination of field equipment should occur before equipment is used if the cleanliness of equipment is unknown and after each use.

6.1.2 Before proceeding, obtain materials listed in Equipment Checklist (Attachment A). This list provides general guidance and should be modified to site-specific needs. Restock supplies as necessary.

6.1.3 Check the sampling plan to determine if equipment blank rinsate (samples) are required. See SOP 4.9, "Collection of Field QA/QC Samples," for the collection of equipment blanks when specified in the sampling plan.

6.2 Site 300 Decontamination Procedures

6.2.1 Decontamination of Tritium Contaminated Equipment

Any equipment or materials contaminated with tritium must be decontaminated in the area containing this particular contaminant using the appropriate method described in Sections 6.2.2 through Sections 6.2.4. The rinse and wash water must be contained in a drum and allowed to evaporate similar to the procedures used for purge fluids (see SOP 4.7B, "Site 300 Treatment and Disposal of Well Development and Well Purge Fluids").

6.2.2 Decontamination by Rinsing

This is normally performed when contaminant concentrations are negligible or are of a nature where detergents are not necessary. This method is particularly applicable for water soluble compounds or those of a inorganic nature. Contaminants that will not readily adsorb onto the surfaces of equipment and are easily rinsed off the equipment, fall into this category.

A. Remove any solid particles from the equipment or material.

B. Triple rinse equipment with analyte-free water.

C. Collect rinsate water and allow to evaporate.

D. If time permits, place equipment on a clean surface and allow to air dry. If equipment is needed immediately for use, ensure that the equipment has been thoroughly rinsed with analyte-free water and wiped with a chemical-free cloth or paper towel to remove excess water.

6.2.3 Decontamination by Hand Washing with Detergent

Hand washing using a detergent such as Alconox®, is performed when contamination is known or suspected to be present, and particularly when organic constituents are involved. This method applies when triple rinsing is not sufficient to remove contaminants, and steam cleaning is not necessary.

A. Acquire appropriate Personal Protective Equipment (PPE) before proceeding (i.e., gloves, safety glasses, coveralls, etc.). (See SOP 4.1, "General Instructions for Field Personnel").

B. Triple rinse with analyte-free water being careful to collect rinsate.

C. Using appropriate brush and detergent, scrub equipment until contaminants have been amply broken down.

D. Triple rinse again with analyte-free water and inspect equipment. Repeat this process as many times as necessary until equipment is visually clean.

E. Allow to air dry for 15 min or wipe dry with a clean cloth or paper towel.

F. Properly dispose of all rinsate water according to SOP 4.7B, "Treatment and Disposal of Well Development and Well-Purge Fluids," after equipment blanks are collected. Wash or appropriately discard any contaminated PPE.

Note: Rinsate containing detergents cannot be discharged to ground or storm drain!

6.2.4 Decontamination by Steam Cleaning

Steam cleaning is performed when equipment is too large to hand wash, or when high-temperature, high-pressure steam is necessary. Steam cleaning can be done at Building 843 provided: (1) it is not a vehicle or drill rig, (2) the equipment has

not come in contact with any oils or greases (O&G), and (3) the equipment has not been contaminated with radiological compounds. Drill rigs, vehicles, or equipment contaminated with O&G, must be steam cleaned at the Building 879 Motor Pool, and then taken to the process area at Route 3 "Stand pipe wash down area."

A. If the equipment has been contaminated with tritium, it must be cleaned per Section 6.2.1.

B. The steam cleaning troughs are clearly marked with signs. Keep all equipment to be decontaminated over the troughs during steam cleaning.

C. To insure the proper use of the steam cleaner, check with the Building 843 or Building 879 Supervisor for any additional instructions that may be applicable (i.e., safety, operation, maintenance, cleanup, etc.).

D. Before proceeding, ensure that tanks or troughs have adequate capacity to contain the rinse water. If steam cleaning at Building 879, ascertain that the drain is not clogged with mud or debris.

E. Steam clean all equipment, and ensure that the equipment remains clean while in transport to, or at, the field site. Plastic sheeting should be used beneath equipment stored on the ground.

Note: When the Building 843 retention troughs are nearly full, arrange sampling and analysis for metals, VOCs, O&G, and pH. Transport water to Building 833 Water Treatment Facility when appropriate.

6.2.5 Decontamination of a Portable Pump

A. Rinse pump and discharge line by spraying analyte-free water on the exterior components where contact is made with contaminated well water.

B. The pump is then inserted into a 55-gal drum containing analyte-free water and the discharge lines are purged for approximately 5 min.

C. Collect all rinsate and purge water and dispose of according to SOP 4.7B.

D. Document decontamination activities in the appropriate Document Control Logbook.

6.3 Livermore Site Decontamination Procedures

The Livermore Site does not allow evaporation of any rinsate or purge water as a method of waste reduction.

6.3.1 Decontamination of Field Equipment

A. Remove any solid particles from the equipment or material.

B. Rinse equipment with analyte-free water.

C. Collect rinsate water and dispose of per SOP 4.7A, "Treatment and Disposal of Well Development and Well-Purge Fluids."

6.3.2 Decontamination of a Portable Pump

A. Rinse pump and discharge line by spraying analyte-free water on the exterior components where contact is made with contaminated well water.

B. The pump is then inserted into a 55-gal drum containing analyte-free water and the discharge lines are purged for approximately 5 min.

C. Collect all rinsate and purge water and dispose of according to SOP 4.7A.

D. Document decontamination activities in the appropriate Document Control Logbook.

6.4 Livermore Site and Site 300 Field Post Operation

Properly dispose of expendable items that cannot be decontaminated. Contact Hazardous Waste Management if necessary.

7.0 QA RECORDS

7.1 Document Control Logbook

8.0 ATTACHMENT

Attachment A—Equipment Checklist

Attachment A

Equipment Checklist

EQUIPMENT CHECKLIST

____ Cleaning liquids such as soap and/or detergent solutions, tap water, analyte-free water

____ Chemical-free cloth or paper towels

____ Cleaning brushes

____ Cleaning containers such as plastic buckets or galvanized steel pans

____ Waste-storage containers such as drums and plastic bags

____ Steam cleaner

____ SOPs